THE FLUVIFAUNULAE OF AUSTRALIA.

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(*Contribution from the Australian Museum, Sydney, N.S.W.*)

Zoogeographical regions and areas have been determined from the study of mammals, birds, fishes and molluscs, and these generally coincide with the divisions indicated by geological and botanical research.

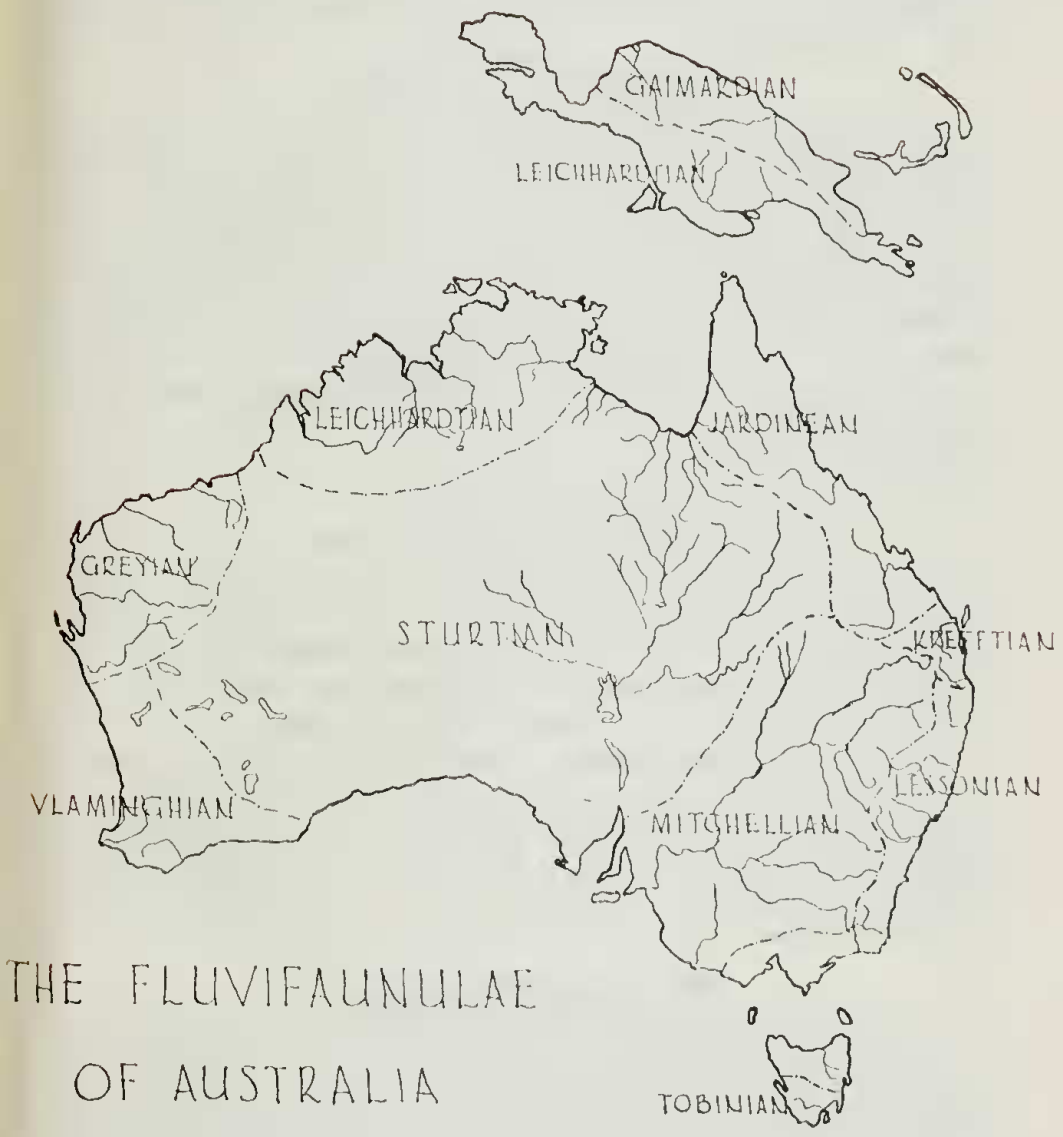
The animals, inhabiting the rivers and lakes, are now recognised as being in agreement with modification, and unfortunately the river systems are not distinctive enough to enable usage of their names. Consequently, a nomination is introduced similar to that already in use for the regions and areas. A preliminary note has appeared in the introduction to the Basic List of the Land Mollusca of Australia (Austr. Zool. Vol. VIII p.290, Mch. 12 1937), and as the data there noted have been confirmed by a study of some freshwater fishes from New Guinea and Australia, it is confidently anticipated that research in other groups will follow on the same lines. It must be remembered that the fluvifaunulae are portions of the faunulae and subordinate thereto, but not exactly agreeing with the known limits of the distribution of the land faunulae.

Leichhardtian Fluvifaunula.

The LEICHHARDTIAN FLUVIFAUNULA is that inhabiting the rivers of the Northern Territory, from Port Essington eastwards, and Queensland, west of Torres Straits. This extends northwards to take in the river faunulae of Southern New Guinea. The name is given in memory of the unfortunate explorer Leichhardt, who made the first crossing of these North Australian rivers from Queensland to Port Essington. The notable fish are the genera *Scleropages* (Barramundi), *Toxotes* (Archer Fish), true *Melanotaenia* (Sunfish), *Acanthoperca* (Chanda Perch), *Anodontiglanis* (Catfish), *Glossamia* (aprion) and *Kurtus*. A noteworthy negative feature is the absence of Eels. Among the Freshwater Mussels nothing remarkable has yet been recorded, but the Bullinid gastropods show the quaint flat-topped *Amerianna and Oppletora* (the *Physopsis*-like *jukesii* H. & A. Ad.), while Viviparine molluscs are here predominant.

Greyian Fluvifaunula.

Westward, the GREYIAN FLUVIFAUNULA, inhabiting the rivers of the Dampierian Sub-Area, is little known as yet, but



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already a peculiar family *Nannatherinidae* related to the Australian freshwater Sunfish has been recognised, while Eels are present. A very remarkable Mussel, *Lortiella,* has already been discovered, and other freshwater mollusca are known, but these show no extra-ordinary forms. This is the least known of the districts of Australia as to its fish and molluscan faunulae so anything may yet turn up.

Vlaminghian Fluvifaunula.

The VLAMINGHIAN FLUVIFAUNULA occurs in the Leeuwinian Area, and although this is also not well known, and nothing distinctive of an Autochthonian element has yet been noted unless *Bostockia* (Perchlet) be such. Another strange Perch (*Edelia*) exists, and the species of *Galaxias* (Native Trout) are there different, and it is suggested that when these, *Terapon* (Grunters) and Gudgeons are intensively studied, they will be differentiated in accordance with the fluvifaunulae here distinguished. The Freshwater Mussels are separable as *Westralunio,* while Viviparine molluscs do not enter into this fluvifaunula, though Bullinids are present.

Sturtian Fluvifaunula.

The STURTIAN FLUVIFAUNULA inhabits the rivers and lakes of the Centralian or Larapintine Area westward of the Darling, which has a fluvifaunula of its own. A peculiar Goby (*Chlamydogobius*) has been described, but as would be anticipated, fish are not numerous. The molluscs show specialisation, a Viviparine evolution, *Centrapala,* being noticeable, as also the widely spread Bullinid genus, *Isidorella,* and the Mussel genus, *Centralhyria.* A very remarkable molluscan form, *Coxiella,* frequents the salt-water lakes of the Vlaminghian sector, and recurs in the Bassian sector, while a development, *Coxielladda* (type, *Paludina gilesi* Angas) is found in the salt-water lakes of the Sturtian influence.

Mitchellian Fluvifaunula.

The MITCHELLIAN FLUVIFAUNULA is very striking, occurring in the Darling, Murrumbidgee, Murray, with their tributaries and the river captures of South Eastern Queensland. The world-famous Murray Cod (*Maccullochella*) characterises this fluvifaunula, but it is not alone, being accompanied by the quaint Bass (*Macquaria*), the Catfish (*Tandanus*), the Slippery Blackfish (*Gadopsis*), and *Blandowskiella,* a distinctive Chanda Perch. Eels are absent, a noteworthy negative item.

The large Freshwater Mussel, *Alathyria,* is notable in this fluvifaunula.

Lessonian Fluvifaunula.

The LESSONIAN FLUVIFAUNULA is restricted to the rivers of Eastern New South Wales, Victoria, and North Tasmania, and includes *Austrocobitis* (Jollytail), *Retropinna* (Troutlets), *Potamolosa* (Freshwater Herring), *Trachystoma* (Freshwater Mullet), Bullrout (*Notesthes*) and *Pseudomugil* (Blueeyes). Eels are well distributed, the dominant form being *Anguilla australis*.

The molluscs are remarkable for the development of the freshwater Mussels, four genera being peculiar, *Hyridunio, Rugoshyria, Propehyridella* and *Protohyridella,* the first-named being also recorded from the Mitchellian sector. The Bullinidae is also well represented by numerous species whose affinities are not well understood, the Sturtian *Isidorella* also wandering through the Mitchellian into this faunula.

Tobinian Fluvifaunula.

The TOBINIAN FLUVIFAUNULA is known only from the Southern portion of the Maugean Sub-Area and is distinguished by the peculiar Troutlet, *Lovettia,* while Lamprey occur in this fluvifaunula, also entering the Mitchellian, while one genus (*Geotria*) even extends to the Vlaminghian fluvifaunula. *Retropinna tasmanica* is a southern outlier of a Lessonian group. Negatively, among the Mollusca, Mussels are entirely missing, while (Neozelanic) Potamopyrgids flourish: the extraordinary freshwater limpet, *Legrandia* (= *Tasmancylus*) distinguishes this fluvifaunula absolutely.

Krefftian Fluvifaunula.

The KREFFTIAN FLUVIFAUNULA is comparable with the land faunula of the Oxleyan Sub-Area, practically occupying that region; the characteristic Lungfish, *Neoceratodus*,, being otherwise unknown throughout Australia. Among the molluscs a similarly unique Mussel, *Cucumerunio,* and a Viviparine genus *Larina,* have no known relations.

Jardinean Fluvifaunula.

Northwards, the JARDINEAN FLUVIFAUNULA, corresponding with the Torresian faunula of the Solanderian Sub-Area, is very little known, a Sunfish (*Rhadinocentrus*) and representative forms of the Lessonian *Glossamia* (*gillii*), *Craterocephalus, Melanotaeniidae* and *Pseudomugil* are on record. The eel, *Anguilla reinhardtu,* is alone found though is extends southward into the Lessonian sector. Among the freshwater Mussels, *Rugoshyria aquilonalis* may be characteristic, as also *Jardinella* (type, *Petterdiana thaanumi* Pilsbry), a small globose freshwater Rissoid, of unknown relationship.

Gaimardian Fluvifaunula.

To conclude, the north portion of New Guinea shows a distinct fluvifaunula, which is named the GAIMARDIAN, a large Eel providing food for speculation as it is living in waters apparently without outlet to the sea. The sunfishes provide characteristic genera such as *Glossolepis, Centratherina* and *Chilatherina.* The molluscan faunula has not yet been investigated but a Mussel with northern relationship has been named.

As regards the nomination proposed Leichhardt has been explained, while Sir George Grey explored the rivers of the North-West, Vlamingh discovered Swan River, Sturt as explorer of the centre is well famed, Mitchell investigated the interior N.S.W. river system, Murray, Murrumbidgee, Darling etc., Lesson collected the first river molluscs and fishes in the east, Tobin was an early South Tasmanian investigator, Krefft brought to science the Lungfish, while the Jardines, associated intimately with Cape York, travelled all along the North Queensland coast.

PROCEEDINGS.

September 11, 1937.—Excursion to Sturt Valley, leader Mr. E. H. Ising, who identified the flora met with and gave a talk on the Compositae with illustrations.

September 21.—Lecture on "New Zealand" by Mr. E. A. S. Thomas, who was the delegate to the meetings of the Australasian and New Zealand Association for the Advancement of Science in Wellington, New Zealand, January 1937.

September 25.—Visit to Mr. E. Ashby's garden at Blackwood where many native plants are grown.

October 2.—Visit to Mr. F. C. Payne's garden at Torrensville. Ponds, rockeries and garden shrubs were inspected.

October 13.—Excursion to Myponga, leader Mr. A. K. Newbery, chairman. A large variety of native flowers was collected to exhibit at the Wild Flower Show on the 15th and 16th. A visit was paid to Mr. H. Dodd's, Honeysuckle Flat, and the party was kindly entertained at morning tea.

October 19.—Talk on "The Barrier Reef" by Mr. F. W. Moorhouse, Chief Inspector of Fisheries and Game. Mr. A. J. Morison lent a number of shell specimens for the evening.

October 30.—Excursion to Blackwood, leader Mr. H. Goldsack, who dealt with orchids during a very pleasant ramble near Eden.

November 6.—Excursion to Bridgewater, leader Mr. E. H. Ising, who identified many native plants and spoke on the Leguminosae order and illustrated the three sub-orders.